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RELATIVE IMPORTANCE OF SELECTED
SUBJECT AREAS FOR ACQUISITION PROJECT
OFFICER TRAINING

THESIS

Scott A. Smith, B.S.
Captain, USAF

AFIT/GSM/LSY/88S-26

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DEPARTMENT OF THE AIR FORCE
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AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Systems Management

Scott A. Smith, B.S.

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September 1988

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Preface

This research study was conducted to determine the relative importance of subject areas of training typically recieved by junior acquisition officers. The attitudes of both acquisition officers and others taking the training with acquisition officers were collected in this research.

Many of the AFIT instructors have played a role in providing the tools to accomplish this thesis research. A special thanks goes to Capt Terry Adler and Capt Mun Kwon for allowing me to pursue my own research, and their help and guidance in pulling it all together. Finally, I thank my wife, Debra, for her understanding and ability to occupy Nathan and Nicolas so they did not miss dad quite so much.

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Abstract

The objective of this research was to determine a relative ranking (in terms of need for job accomplishment) of acquisition training course subject areas for use in updating and improving training courses. The analysis was accomplished by examining the attitudes of personnel taking the training courses typically received by junior acquisition personnel. Specifically, the attitudes towards whether or not particular subject areas are needed for an individuals job accomplishment were solicited. Key findings are that the subject areas most needed for job accomplishment are Group Decision Making, Contracting, and Communications Skills. Specific recommendations to implement these results in junior acquisition officer training courses are made, as are recommendations for further research in this area. Results are based on a small sample and it is recommended that further research be accomplished to further validate the results. Specific recommendations for further research are included in the document.

Handwritten notes:
- Training
- Training
- Training

RELATIVE IMPORTANCE OF SELECTED
SUBJECT AREAS FOR ACQUISITION PROJECT
OFFICER TRAINING

I. Introduction

In recent years the costs of defense weapons systems have increased at such an alarming rate that if the trend continues the Department of Defense would be able to afford only one aircraft per year by the year 2036 (3:253). There have been frequent news reports of cost overruns, spare parts overpricing, and systems that are not maintainable. It has been found that these problems rarely arise from fraud or dishonesty; instead, they stem from problems with the acquisition system (16:5). One often cited problem with the acquisition system is the training and development of acquisition personnel, especially at the project officer or program manager level in the Defense Department acquisition structure.

The recently completed Presidents Blue Ribbon Commission on Defense Management (Packard Commission) report on Defense Acquisition states that " . . . it is vitally important to enhance the quality of the defense acquisition work force -- both by attracting qualified new personnel and improving the training and motivation of current personnel "

(16:28) The Packard Commission report and the recently completed General Accounting Office (GAO) report on DOD acquisition (20) both highlight the training and career development of acquisition program managers as areas needing continual updating and improvement. In addition, an Air Force Systems Command (AFSC) Working Group determined that AFSC is "suffering from an acute shortage of experienced military officers, although fully manned in acquisition personnel" (15:1). Two ways to help compensate for this shortage of experienced AFSC acquisition personnel are to train more personnel, and to provide more effective training to the inexperienced acquisition personnel. This research focuses on the aspect of more effective training by exploring the acquisition training course content.

Specific Problem

In AF Systems Command, there are three officer specialty groups that perform acquisition management. They are, the Acquisition Project Officer, the Acquisition Management Officer, and the Acquisition Program Manager (14:16). Much has been done recently for improving the training and career development of Acquisition Program Managers (AFSC 29xx), with little emphasis on training improvements for the Acquisition Project Officer (AFSC 2724) and the Acquisition Management Officer (AFSC 2716). Ironically, it is these two groups that perform much of the acquisition work in Air Force Systems Command. In fact, of the 8,000 acquisition officers in Systems Command, 45

percent are lieutenants, and 32 percent are captains (12:22).

According to AFR 36-1, the 2724 AFSC (Acquisition Project Officer), 'identifies positions with the responsibilities for assisting in the planning and management of the system, subsystem, or equipment acquisition programs' (5:A10-29/30). Similarly, the 2716 AFSC, Acquisition Management Officer, 'identifies positions with responsibilities for systems, major subsystems or equipment, or in the overall aspects of the program management effort' (5:A10-29/30). This research will explore the training of the Acquisition Project Officer and Acquisition Management Officer, from herein referred to as junior acquisition officers. More specifically, this research will examine the subject areas of early career acquisition training with an overall goal of determining a ranking of subject areas from those perceived as most critical for maximizing job performance to those perceived as least critical. This information can be used in making intelligent decisions on where to increase or decrease emphasis when reviewing and updating training courses typically taken by junior acquisition officers.

Before proceeding further, it must be understood that the same training typically received by acquisition officers in the early part of their career is also received by acquisition related personnel (non 27xx) and other personnel working in System Program Offices (SPO's). Additionally, because of a new acquisition management career development model (AFSCR 36-5), there will be increased pressure for

non-acquisition personnel to receive acquisition training so they are able to enter the acquisition field at some later point in their career.

This situation compounds the problem of determining which subject areas should be given more (or less) emphasis when updating training because of the separate needs of these different groups (SP0, non SP0, 27xx, non 27xx). In an effort to achieve greater training efficiency, it would make sense to emphasize the subject areas that are perceived as being needed by all groups, and similarly decrease emphasis those that are perceived as being relatively less useful. This research attempts to clarify the relative importance of training subject areas within and between these different groups. The following investigative questions serve to further define specifically what information this research intends to uncover.

Investigative Questions

- 1) What is the relative ranking (in terms of perceived need for job accomplishment) of subject areas typically taught to junior acquisition officers during acquisition training?
- 2) Which subject areas, if any, are ranked significantly higher than the others by all personnel taking the training typically received by a junior acquisition officer? Which, if any, are ranked significantly lower?

- 3) Are there significant differences between the subject area rankings of the junior acquisition officer (27xx personnel) and others (non-27xx personnel) taking the same training?
- 4) Are there significant differences between the subject area rankings of personnel performing System Program Office (SPO) duties versus those not performing SPO duties?
- 5) Which subject areas, if any, are perceived by the junior acquisition officer (27xx) as being needed prior to beginning an assignment as an Acquisition Project Officer?
- 6) Which subject areas, if any, are perceived by the SPO personnel as being needed prior to beginning an assignment in a SPO?

Definitions

For the purposes of answering the Investigative Questions above, the terms "subject area", "SPO personnel", and "27xx personnel" must be further defined. The first two are defined in this section, and "27xx personnel" is defined and discussed in the next section.

1. Subject Area: a breakdown of acquisition training courses into smaller units initially based on the functional index of the Defense Systems Management College (DSMC) Program Managers Notebook (18:vii). This functional index was modified to include

additional lessons from acquisition training courses examined in the Literature Review chapter of this thesis. In most instances, several lessons have been combined into a single subject area. In some cases, several courses have been combined into a single subject area. All individual subject areas are operationally defined in the conclusion of chapter 2.

2. SPO Personnel: an individual that works in a System Program Office (SPO) and has responsibility for assisting in the planning or management of a system, subsystem, or equipment acquisition program.

Background

The Air Force categorizes officers based on the function they perform. The functions are categorized by an Air Force Specialty Code (AFSC). The AFSC is a four digit number where the first two digits define a utilization field and the second two define a specialty within that utilization field. There are two utilization fields in the Air Force whose primary duty is considered acquisition management. These are the Acquisition Program Management (27xx) and the Program Management (29xx) utilization fields (14:16).

A junior officer enters the 27xx career field as a 2721 (intern acquisition officer), and then progresses to the 2724 AFSC after 18 months experience. The 2721 and 2724

AFSC applies primarily to company grade officers. The field grade follow-on to the 2721/2724 AFSC is the 2711/2716 AFSC, or intern and experienced Acquisition Management Officer. The Acquisition Management Officer "performs as Program Manager (PM) for the acquisition of any program not meeting the definition of a major program" (14:17). The Acquisition Management Officer is a field grade officer, and not really a junior officer. For the purpose of this study however, he is considered a junior acquisition officer if taking the training typically given to Acquisition Project Officers. Finally, the acquisition management of major programs is performed by the Program Manager (2996) who "directs and provides executive management supervision for major acquisition programs" (14:17).

The Air Force has recently developed an acquisition manager career development model which specifies the requirements for achieving four levels of certification on the way to becoming a program manager (AFR 36-5). The requirements for the each of the four levels are shown below :

1. First Level: "the first level would be attained early in an officer's career (within the first year or two) and would include a bachelor's degree, 6 months experience in a system project office(SPO), and completion of the System Acquisition School's Introduction to Systems Command Acquisition Management course at Brooks Air Force Base" (12:22).
2. Second Level: "Occurs at about the 6-year point and would include Squadron Officer's School, 2 years experience in a SPO, completion of the Air Force Institute of Technology(AFIT) Systems 200 course(or equivalent), and a year of operational experience

(through a CROSSFLOW or BEST type of program) , or 2 years experience in other non-acquisition areas with AFSC or the Air Force Logistics Command" (12:22) .

3. Third Level: "Occurs at about the 12-year point and would include completion of Intermediate Service School, a masters degree, other job experience (e.g. headquarters assignments, joint assignments, work in other SPO's, other AFSC/AFLS jobs), at least 3 years experience in a SPO, and completion of the AFIT Systems 400 course(or equivalent)" (12:22) .
4. Fourth Level: "Occurs at about the 16-year point and includes completion of Senior Service School , 8 years of acquisition experience, the Defense Systems Management College PMC or equivalent, and 2 years experience as a project manager within a SPO. Additionally, AFSC/CC approval of the acquisition manager would be required to attain this level" (12:22) .

This model was designed to "produce an acquisition manager with a broad experience base and allow for transition into the acquisition management career field by individuals from related acquisition fields; e.g., 26xx, 28xx, 29xx, 49xx, 65xx, 673x, 674x, and individuals from the rated force" (12:22). The very necessity of AFSC to quantify and qualify requirements for experience designators or levels indicates little previous organization or pattern for acquisition training. In fact, it is only recently that acquisition training and the content of that training has been addressed at a DOD level.

A typical junior acquisition officer following the AFSC proposed career development model will most likely have achieved either the second or third level of certification. Therefore, acquisition training at this stage would generally consist of completion of the Systems Acquisition

School's Introduction to Systems Command Acquisition Management course (SAS 001) or equivalent; completion of the AFIT Acquisition Planning and Analysis course (SYS 200) or equivalent; possible completion of the AFIT Intermediate Program Management course (SYS 400); and completion of two additional acquisition related specialty courses (13:76). AFSCR 36-5 defines specialty training as 'courses in any of the following subject areas: program management, financial management, contracting, technical management, logistics, or quality assurance' (4:11). Within AFSC, each Product Division provides an Acquisition Management Orientation Course to its newly assigned personnel.

The subject areas that comprise the curriculum of the acquisition training described above are explored in detail in the next chapter. In addition to formal acquisition training, it is expected that the officer would have completed Squadron Officer's School, and a masters degree, and possibly an Intermediate Service School such as Air Command and Staff College (ACSC).

Scope and Limitations

This research is limited to an analysis of the subjects of training an AF acquisition officer will receive in the early part of his/her career. There is a wealth of information available on the training and career development of program managers for major weapons systems acquisitions, and as pointed out earlier, this research will instead focus on the less understood needs of the younger more

inexperienced version of the program manager: the Acquisition Project Officer and Acquisition Management Officer.

This research does not address the overall effectiveness of junior acquisition officer training because this issue has been previously addressed. In fact, a recent AFIT thesis has shown that 'approximately 84 percent of the junior officers either strongly or moderately agreed that these courses [SAS 001/SYS 100/SYS 200] provide an effective foundation for the development of 27xx officers' (13:39). This research on the other hand, looks within the training courses for information applicable to the continual 'fine tuning' effort to update and improve acquisition training. This 'fine tuning' of acquisition training is particularly important because of the dynamic nature of the acquisition process itself.

This research does not address the other components of the DOD who also participate in significant acquisition efforts, with separate training and career development programs for their acquisition personnel. Within the AF, this research is limited to the acquisition training typically received by the 27xx AFSC.

Finally, there are many different categories (besides SPO/non-SPO and 27xx/non-27xx) of those that are currently taking the training of a junior acquisition officer. These include differentiation by the Product Division worked in; by whether an individual is civilian or military; the level

of academic degree; rank or grade; level of Professional Military Education and others. The student population in the SAS 001/SYS 100/SYS 200 course flow can be divided into SPO personnel and support (non-SPO) personnel or Acquisition Project/Management Officers (27xx) and related acquisition officers (non-27xx). It was decided, therefore, that division into the categories of SPO/non-SPO and 27xx/non-27xx would provide the most applicable information to this research effort.

Additionally, no attempt is made at trying to measure the job competency/performance of the acquisition officer. The survey questions described in the Methodology chapter simply ask the individuals whether a particular subject area is necessary to accomplish his/her job, and whether or not it is needed for maximizing job performance/competency. The responses therefore will depend in part on each individuals personal perception of the meaning job performance, job competency, and job accomplishment. Finally, it is recognized that many other factors besides formal acquisition training (such as experience and education) will affect the job competency of this individual.

II. Literature Review

This chapter explores the current subject areas that comprise the curriculum of the Brooks SAS 001 and the equivalent AFIT introduction to acquisition management (SYS 100), the applicable PCE acquisition related specialty courses, SYS 200 and its equivalent (Brooks SAS 006), the AFIT SYS 400 course, and the Aeronautical Systems Division (ASD) Acquisition Management Orientation Course. The acquisition related specialty courses come from the Professional Continuing Education (PCE) program of the School of Systems and Logistics at Wright-Patterson AFB. This PCE program provides updating of professional and technical skills in the entire field of systems and logistics (17:1). Only the PCE courses that would be open to the Acquisition Project Officer (based on the prerequisites for attendance) are discussed here.

In addition to the training courses listed above, a few recommendations from acquisition experts in the area of program manager training are summarized. These references are listed under the category of "other" subjects of training for acquisition officers.

SAS 001, Introduction to Systems Acquisition Management is the Air Force Systems Command (AFSC) introductory course to acquisition management taught at Brooks AFB. As such, it provides the overview of

acquisition management to many types of AFSC personnel, not just Acquisition Project Officers and Acquisition Management Officers. An equivalent introductory course open to all AF personnel is SYS 100, Introduction to Acquisition Management, taught at the Air Force Institute of Technology (AFIT) located at Wright-Patterson AFB. The SYS 100 course is open to all AF personnel, not just Air Force Systems Command personnel. Presumably this is to ensure that officers not currently working in the 27xx acquisition area can still fill the certification levels for future entry into the acquisition management field. These courses also serve to supplement their knowledge in supporting the design, development, and production of Air Force weapons systems.

The subject areas of SAS 001 and SYS 100 are presented below, first listing the common areas, then the subject areas unique to SAS 001, and finally the areas unique to SYS 100. The categorization of common and unique areas comes from an AFIT/LSY comparison of HQ AFSC system acquisition program management courses with corresponding AFIT courses (19).

Common Subject Areas (SAS 001/SYS 100)

1. Acquisition Business/Process. This subject area includes AF program management policies, procedures, decision points and system phases.
2. Acquisition Organization. This area includes the role of the program manager, the implementing command, the supporting command, the participating command, and the using command. Also included is the function and

structure of a program office and its functional support agencies.

3. Planning, Programming and Budgeting System (PPBS). This subject area includes the phases of the budget cycle, the purpose and structure of the Five Year Defense Program (FYDP), the Program Objectives Memorandum (POM) development process, the various appropriation accounts, the Joint Strategic Planning Document (JSPD) and the Defense Guidance (DG).
4. Request for Proposal (RFP)/Statement of Work (SOW). This subject area includes the purpose for and the information required in a RFP/SOW.
5. Contract Management concepts including proposals, bids, and quotes; authority and responsibility of the contracting officer; Federal Acquisition Regulation (FAR) requirements for competition and delivery schedules; and the format and types of contracts used in the acquisition process.
6. Systems Engineering. This subject area includes a description of systems engineering activities; the tradeoffs impacting system effectiveness; the purpose and timing of the various reviews such as the Preliminary Design Review (PDR) and the System Readiness Review (SRR).
7. Configuration Management. This subject area includes the concepts of a configuration item, the Configuration Control Board, and configuration audits.
8. Integrated Logistics Support (ILS). This subject area defines and discusses the ILS elements which are maintenance planning; manpower and personnel; supply support; support equipment; technical data; training; training support; computer resources; facilities; packaging, handling, and transportation; and design interface.
9. Data Management. This subject area covers the concepts of the Contract Data Requirements List (CDRL), Data Item Descriptions (DID's), the Acquisition Management Systems and Data Requirements Control List (AMSDDL), and the process used to identify data requirements.
10. Manufacturing Management. This area describes role of manufacturing management in the acquisition process and describes the major reviews used to assure production readiness.
11. Test and Evaluation. This subject area describes the

purpose of and the organizations involved in test and evaluation.

SAS 001 Unique Subject Areas

The descriptions for the SAS 001 Subject Areas are taken from the course Desired Learning Outcomes handbook and represent a summarization of lesson objectives and desired learning outcomes (10).

1. AFSC Baselineing Process. This subject area defines the objective of Program Baselineing and describes the causes and impact of program instability.
2. Cost/Schedule Control Systems Criteria (C/SCSC). This subject area describes the purpose, benefits, and limitations of C/SCSC; the concepts of cost and schedule variance; the concept of Work Breakdown Structure (WBS) and its relation to C/SCSC; and a description of the two major financial reporting data items.
3. Mission Critical Computer Resources (MCCR). This subject area defines MCCR and the differences between MCCR and automatic data processing equipment.
4. Acquisition Logistics. This subject area describes the integrated logistics support activities in the systems acquisition process.
5. Source Selection. This subject area describes the purpose of the source selection process; the participants involved; and the purpose of fact finding and negotiation.
6. Subcontract Management. This subject area defines the difference between prime contractor, associate contractor, subcontractor and vendor. It also stresses the importance of subcontract management in the acquisition process.
7. Contracting Function. This subject area defines a contract; the responsibility and authority of the Principal Contracting Officer (PCO); the methods of contracting; and the role of competition in the acquisition process.
8. Contract Administration (CAS). This subject area describes the functions of and the players involved in contract administration; the mission of the Air

Force Plant Representative Office (AFPRO); the concepts of pre award survey, post award conference, and Memorandum of Agreement (MOA).

9. Application of Research and Development (R&D). This subject area describes 'the purpose of and organizations involved in DOD funded research and development' (10:10).
10. Survivability/Vulnerability. This subject area describes the 'importance of the Air Force Survivability/Vulnerability Program in the systems acquisition process and what Reliability and Maintainability consists of , and how it relates to the overall systems acquisition life cycle' (10:11).
11. Scheduling Techniques. This subject area describes the various scheduling techniques and how they are applied.
12. System Turnover. This subject area describes the process of turnover of a system from the implementing command to the operating command, and the transfer of program management responsibility to the supporting command.

SYS 100 Unique Subject Areas

The descriptions for these subject areas come from the SYS 100, Introduction to Acquisition Management Textbook and represent a summarization of the lesson objective and samples of behavior for each lesson (9). The subject areas themselves represent individual lessons of the course.

1. Communication Exercise. This exercise describes the communication process in management.
2. Program Control/Cost Estimating. This subject area describes 'the role of program control and cost estimating in the management of an acquisition program and how the WBS facilitates this role' (9:15-1).
3. Solicitation Process. This subject area describes the purpose of, and the major documents and players involved in the solicitation process.

4. External Program Management. This subject area describes the roles of the Program Element Monitor (PEM), Systems Officer (SYSTO), Government Accounting Office (GAO), and AFPRO; it also describes the purpose of the management, command, and Secretary of the AF program assessment reviews.
5. Manufacturing Initiatives. This subject area describes the following manufacturing initiatives: Industrial Modernization Incentive Program; Work Measurement; Transition from Development to Production.
6. Changes to AFR 57-1. This subject area describes the current changes to AFR 57-1, Operational Requirements: Operational Needs Requirements, and Concepts.

SYS 200 Subject Areas.

SYS 200, Acquisition Planning and Analysis, is the course required for the intern Acquisition Project Officer (AFSC 2721) to upgrade to a fully qualified Acquisition Project Officer (17:69). However, 2721's working in related acquisition fields such as financial management, configuration management, integrated logistics support, or test and evaluation can take different courses for upgrading (17:69). These courses are SYS 225 (Acquisition Logistics), SYS 227 (Financial Management in Weapons System Acquisition), SYS 228 (Applied Configuration Management), and SYS 229 (Test and Evaluation Management).

SYS 200 is designed to provide "basic management level task accomplishment in a program office" (17:69). In addition to providing more detail to the overview gained in SAS 001, this course emphasizes practical exercises "such as generating a POM, writing a SOW, using cost estimating resources, analyzing contractor performance and developing planning networks" (17:69). The course length is 15 days.

The subjects areas of SYS 200 presented below are taken from the course material (1).

1. Role of the Project Officer. This section describes a project officer's job and responsibilities within a System Program Office (SPO).
2. Acquisition Process. This section describes acquisition management principles and objectives. The role of the Statement of Operational Need, Mission Need Statement, Program Management Directive, System Concept Paper, Acquisition Decision Memorandum, and other key documentation is described.
3. Acquisition Contracts. This lesson describes the method used for planning and awarding contracts.
4. Acquisition Planning Exercise. This exercise enhances the understanding of the acquisition strategy and its use in the acquisition process.
5. Financial/Manpower Management. This lesson describes the PPBS in terms of its implementation in a SPO, and includes an exercise in preparing a POM.
6. Work Breakdown Structure(WBS). This lesson describes the purpose, structure and use of the WBS; it also includes an exercise in constructing a WBS.
7. Networking Analysis. This lesson introduces the techniques of networking and provides an exercise to reinforce the concepts.
8. Integrative Planning Exercise. This lesson provides an exercise in preparing a SOW, CDRL, Work Breakdown Structure, and a network.
9. Systems Engineering(SE). This lesson describes the purpose of SE, the steps of the SE process, the documentation of the SE process, and the role of the major design reviews and configuration audits in the process.
10. Configuration Management. This lesson describes the role of configuration management in the acquisition process.
11. Specs, Standards and Drawings. This lesson defines and describes specifications and standards. It includes an exercise to apply documentation requirements in a SOW/CDRL.

12. Software Management. This lesson describes the software life cycle and the relation of software support to software acquisition.
13. Test and Evaluation Policy. This section describes current policies on testing and evaluation in the acquisition process.
14. Acquisition Logistics. This section describes the need for integrated logistics process, the participants of the process and the objectives of the process.
15. Requirements Formulation. This lesson is an overview of the requirements formulation process and includes an exercise in developing a SOW/CDRL implementing these concepts.
16. Streamlining Exercise. This lesson provides a look at the process to remove unnecessary specs and standards (chain referencing).
17. Interface with Contracts. This lesson describes the format of a contract, and the role of the Principal Contracting Officer (PCO) and the AFPRO in the contracting process.
18. Dealing with the Contractor. This lesson describes how to successfully meet program objectives through effectively dealing with the contractor.
19. Functions of Program Control. This lesson describes acquisition program baselining, program control elements and their functions.
20. Cost Estimating. This lesson describes techniques and resources available to produce cost estimates. It includes a cost estimating exercise.
21. Performance Measurement. This lessons explains the Performance Measurement Baseline (PMB) and the use of the Cost Schedule Control Systems Criteria.

Specialty Courses Subject Areas

The Professional Continuing Education (PCE) program provides updating of professional and technical skills in the field of systems and logistics (17:1). The PCE program provides over 65 courses, most of which are candidates for

fulfilling the acquisition related specialty course requirement of the Acquisition Project Officer. AFSCR 36-5 defines specialty training as 'courses in any of the following subject areas: program management, financial management, contracting, technical management, logistics, or quality assurance' (4:11). The PCE courses have been grouped by subject areas and are presented below.

1. Reliability and Maintainability (R&M). There are six courses offered in this area. Of these six, two are directly applicable to the Acquisition Project Officer. The others are geared more toward an individual who is a reliability and maintainability engineer, stressing the mathematics and statistics involved in solving reliability problems. All six courses emphasize the affect of R&M on life cycle costs. The two courses directly applicable to the acquisition project officer are as follows:
 - A. QMT 020 Reliability and Maintainability Overview. This is a three day course 'to acquaint program/project managers with the need to include reliability and maintainability (R&M) in weapon system acquisition' (17:29).
 - B. QMT 335 Reliability and Maintainability Design in Systems Acquisition. This is a ten day course geared toward engineering design and is 'intended to teach project engineers the principles, procedures, and techniques of engineering design which can be used to ensure the development/enhancement of reliable and maintainable systems' (17:100).
2. Configuration Management. There are two courses offered in this area, one which is directly applicable to the Acquisition Project Officer. This is SYS 028, Introduction to Configuration Management. The other course is SYS 228, Applied Configuration Management, and is typically taken by 27xx personnel working in the acquisition related field of configuration management (17:69).

- A. SYS 028, Introduction to Configuration Management. This course provides an overview of configuration management activities relating to the acquisition process. The course length is two and a half days.
 - B. SYS 228, Applied Configuration Management. This course 'allows students with a basic understanding of principles and techniques of configuration management to expend that understanding and apply it to simulate configuration management events and documentation' (17:83).
3. Group Decision Making . There are four courses offered in this area. All could be applicable to the Acquisition Project Officer. They are as follows:
- A. OSP 076, Creativity. The purpose of this class is to teach how to increase productivity in an organization (such as a SPO) by making people more aware of their creative ability. Many exercises and workshops are used in this three day course.
 - B. OSP 077, Listening. This course is to help students become better listeners. Course content includes 'categories of listeners, the skills practiced by an active listener, barriers to effective listening, and the rules that a good listener uses in various situations' (17:37). This is a three day course.
 - C. OSP 078, Communication. The purpose of this three day course is to enhance interpersonal communication skills. The course content includes the communication process, feedback, communication barriers, and the responsibilities of group members/leaders. Exercises and workshops are used extensively.
 - D. OSP 079, Conflict Management. The purpose of this three day class is to improve skills in managing conflicts. The course content includes the nature of, and tools to help manage both interpersonal and group levels of conflict.
 - E. OSP 085, Conducting Effective Meetings. This three day course is designed to prepare the participant to conduct effective meetings. Course content includes 'group task vs. maintenance functions, barriers to productive meetings and how to recognize them, hidden agendas, and team building' (17:43).

4. Quality and Productivity. There are nine PCE courses offered in this area. Four of the nine could be of potential interest to the Acquisition Project Officer. They are as follows:

A. QMT 082, Quality and Productivity Improvement Team Process. This five day course is 'designed for individuals who are responsible for developing, educating, and managing problem solving groups. The curriculum is built around a problem solving process, and the tools used in that process' (17:41).

B. QMT 084, Improving Quality and Productivity. This course is designed to teach managers how to improve quality and productivity. It includes a simulation exercise to help reinforce concepts. This is a five day course.

C. OSP 086, Statistics for Quality Circles. This three day course emphasizes the statistical methods that can be used for solving statistical quality control problems.

D. OSP 089, Alternate Problem Solving Methods. This three day course provides problem solving techniques to specialized groups (i.e. managers, scientific, technical).

5. Communication Skills. There are two courses offered in this subject area and both are applicable to the Acquisition Project Officer. They are as follows:

A. COM 210, Technical Writing Seminar. This five day course is designed for personnel who are required to prepare written technical communications as part of their job. The course included 'training in analysis of the communication situation; the determination of appropriate style, tone, and form; evaluation of information and its sources; local and general conventions; and a review of grammar, expression, mechanics, and readability standards' (17:73).

B. COM 215, Briefing Preparation and Presentation. This five day course provides instruction in briefing military subjects to Air Force and DOD audiences. Course content includes 'organization, audience analysis, delivery techniques, and the preparation and use of visual aids' (17:75).

6. Contract Administration. There are four courses in this topic area, only one of which is directly applicable to the Acquisition Project Officer. This is PPM 152, Contract Administration, which is designed to provide the basics to those whose primary duties involve management of government contracts. This is a fifteen day course.
7. Cost Analysis/Contract Pricing. There are a total of eleven courses offered in this subject area. Of these eleven, five of are of potential interest to the Acquisition Project Officer. These five are described below.
 - A. QMT 170, Principles of Contract Pricing. This course content includes "sources of data for cost and price analysis, methods of analyzing direct and indirect costs, performing profit analysis, and selected current pricing topics" (17:62). The class length is ten days.
 - B. QMT 180, Cost Improvement Curve Analysis. This five day course is a follow-on to QMT 170. This course provides the student with "a working knowledge of cost improvement curve theory, competence in ability to apply different mathematical formulation of the cost improvement curve, and an understanding of how the basic assumptions of the cost improvement curve model interact with the realities of the production environment" (17:66).
 - C. QMT 353, Introduction to Life Cycle Costing. "The purpose of this course is to acquaint students from various functional fields (procurement, cost analysis, engineering, logistics, program management) with the fundamental concept of Life Cycle Cost (LCC) as it applies to the acquisition of systems and subsystems" (17:103). The course length is ten days.
 - D. QMT 355, Contractor Overhead Monitorship. This ten day course discusses the relationship of indirect cost, overhead base analysis, monitoring performance, FAR cost principles, and fund overhead settlement to the monitoring of a contractor's overhead cost expenditures.
 - E. SYS 361, Surveillance of Cost/Schedule Control Systems Criteria (C/SCSC). This course teaches the concepts and application of C/SCSC,

including a project analysis exercise.
The course length is ten days.

8. Computer Software Support/Applications. There are three courses that fall into this category, two of which are directly applicable to the Acquisition Project Officer. They are as follows:
 - A. QMT 185, Computer Software Applications. This course teaches the use of the COPPER IMPACT software to students familiar with cost and price analysis. No computer background is required. This is a ten day class.
 - B. SYS 201, Mission Critical Computer Resources Acquisition (MCCR). This course provides an overview of DOD responsibilities in contract surveillance of MCCR acquisition' (17:71). This is a ten day course.
9. Test and Evaluation Management. There is one course specifically designed for this subject area; SYS 229, Test and Evaluation Management. This course examines the role of Test and Evaluation in all phases of the acquisition process. Group exercises help give insight into commonly faced problems. This is an eight day course.
10. Technical Order Acquisition and Management. There is one course that teaches this subject; SYS 230, Air Force Technical Acquisition and Management. 'This course will develop the TO acquisition concept from its inception and discuss the various types of TOs, role of the major Air Force commands in implementing an effective TO system, industry's role in the preparation of TOs, validation and verification of TOs, and the numerous other actions necessary to ensure that TOs are available to Air Force users on a timely basis' (17:87). This is a ten day course.
11. Financial Management. There is one course particularly applicable to the junior acquisition officer in this subject area. This is SYS 227, Financial Management in Weapons Systems Acquisition, a ten day course required for the upgrading of 2721's working in the acquisition related field of financial management (16:69). The course relates the basic acquisition management concepts to the specific activities of the financial manager (16:82).
12. Acquisition Logistics. There is one course in this area directly applicable to the junior acquisition officer. This is SYS 225, Acquisition Logistics, a

ten day course required for the upgrading of 2721's working in the integrated logistics support field (16:65). This course provides an overview of logistics activities in the systems acquisition process (16:80).

SYS 400 Subject Areas

SYS 400, Intermediate Program Management, is for field grade, middle managers in the Air Force Systems Command program office. The course deals with those broader aspects of acquisition and management applicable to middle-level program office positions such as chief of projects' (8:1). This course is not typically taken by the junior acquisition officer, but the analysis of its subject areas is important for the completeness of this literature review. The SYS 400 curriculum is subdivided into two distinct blocks of instruction; the Acquisition Environment; and Effective Middle Management. The topics of the Acquisition block are very similar (but more comprehensive) to what was covered in SAS 001/SYS 100, and SYS 200/SAS 006, and hence will not be covered again. The subject areas of the Effective Middle Management block have not been specifically covered in SAS 001 and SYS 200, and hence are presented below. The descriptions of the various subject areas are paraphrased from the SYS 400 Syllabus of Instruction (8).

1. Interpersonal Communications. This subject area analyzes the communication process, some of the problems that can occur in the process, and solutions a manager can use to correct these problems.
2. Creativity in Management. This subject area discusses barriers that limit creative thinking, and how these barriers can impact the acquisition

process" (8:33). It also discusses the Crawford Slip Method and how it can be used in a SPO.

3. Concepts of Motivation. This subject area discusses the major theories of motivation, and their application to group and individual behavior.
4. Competitive Leadership. This subject area analyzes "the relationship between leadership and management" (8:35). The content also includes theories of leadership; and the relationship of leadership, influence, power, and authority.
5. Executive Stress Management. This subject area describes the "nature of stress and how to cope with stress through management of its demands" (8:36).
6. Management Style. This subject area describes the Myers-Briggs Type Indicator and how to apply it to identifying qualities in oneself and others.
7. Conflict Management. This subject area describes "the impact of conflict on group task performance for the purpose of promoting an integrative team approach" (8:39).
8. Work Planning. This subject area describes the concepts of Management by Objectives, and the employee growth curve.
9. Delegating Authority. This subject area discusses effective delegation and how it is essential for middle management success.
10. Team Building. This subject area describes the actions an acquisition manager can use to build an effective team in the SPO.
11. Time Management. This subject area discusses time management problems and techniques for improving these problems.

Orientation Course Subject Areas

This section describes the course content for the Aeronautical Systems Division (ASD) Acquisition Management Orientation Course. ASD is one of the five product divisions of Air Force Systems Command (AFSC). This five day course is designed to provide newly assigned ASD

personnel 'with a comprehensive overview of the management process by which Air Force systems are acquired and in particular the roles and responsibilities of the program as they relate to the acquisition process' (2:1). This particular orientation course is representative of that offered by the other product divisions, hence only the subject areas from this one will be presented. Subject areas that are unique to ASD (i.e. ASD mission and responsibilities) will not be discussed here. Finally, subject areas which have been completely discussed previously will simply be listed with no discussion.

1. System Acquisition Life Cycle.
2. DOD Planning, Programming, Budgeting System (PPBS).
3. Program Control.
4. Cost Estimating.
5. Financial Management.
6. Systems Engineering
7. Test and Evaluation.
8. Integrated Logistics Support.
9. Life Cycle Cost.
10. Configuration Management.
11. Data Management.
12. Source Selection.
13. System Safety. This subject area introduces the student to 'System Safety principles, theories, and techniques' (2:34). The primary emphasis is on designing safety into weapons systems.
14. Civil Engineering. This subject area discusses the development of facilities requirements data, and the

relationship of facilities to aircraft maintenance requirements.

15. Contract Law. The purpose of this subject is to 'acquaint the student with the role of the legal advisor in the acquisition of systems' (2:38).

16. Defense Contract Administration Services (DCAS).

Other Subject Areas

This section describes other subject area breakdowns found in the literature. A recent AFIT thesis researcher asked the following question to 26 program managers (2996 AFSC) in a structured interview: 'What specific technical areas do you believe may warrant increased emphasis in the training and education of officers who will become SPO directors in the future?' (14:54). The top five responses were:

- 1) Computer Software Development
- 2) Basic Electronics
- 3) General Engineering or Science
- 4) Computer Hardware Technology
- 5) Systems Engineering(Integration)

It was then stated that 'Increased emphasis may be warranted in education or training SPO director candidates in the areas of computer hardware and software, basic electronics, and general science and engineering principles' (14:53).

It will be interesting to see if junior acquisition officers regard these areas as highly as the more senior program managers.

Finally, at least one expert (a former Deputy

Assistant Secretary of the Air Force) has stressed a lack of contract negotiating skills as a major problem with military acquisition officers (7:69). This concludes the review of subject areas currently being taught to junior acquisition officers.

Conclusion

All of the subject areas presented in this chapter have been combined into the following 28 subject areas. As described previously, this was done using the DSMC functional areas index as a baseline, and adding subject areas that could not be placed in any of these categories. The result is the 28 subject areas listed and operationally defined below. These are the subject areas to be ranked by acquisition personnel as to their importance for job performance. The next chapter, Methodology describes how this was done.

1. Acquisition Management concepts including the phases in the weapons system acquisition life cycle; the DAB process and the Defense Acquisition Executive role/responsibility.
2. Acquisition Strategy and planning concepts including the acquisition plan, multiyear procurement and preplanned product improvement.
3. The specifics of how to develop and write an Acquisition Plan.
4. Budgeting and Funding concepts including the planning, programming and budgeting system; cost estimating methodologies; incremental funding and full funding concepts.
5. The specifics of how to develop and write a Program Objectives Memorandum and/or Budget Estimate Submission.

6. Manufacturing and Production concepts including an overview of the declining industrial base problem, the IMIP impact on production cost and quality, and other manufacturing management initiatives.
7. Competition including competition planning, competition requirements and contracting methods.
8. Computers and Software concepts including Mission Critical Computer Resource policy and software cost estimating.
9. Configuration Management concepts including an overview of configuration management activities, data management activities, baselines, audits, and the Work Breakdown Structure.
10. Contracting including the concepts of Request For Proposal (RFP), Statement Of Work (SOW), source selection plan, contract types, incentive contracting, the negotiating process, and contract pricing.
11. The specifics of how to develop and write a RFP and/or a SOW/CDRL and/or a SSP.
12. Contract Management concepts including subcontract management; contract administration; contract changes; contract terminations; and the Federal Acquisition Regulation (FAR) requirements for competition and delivery schedules .
13. Engineering/Technical Management concepts including an overview of the systems engineering process; the SEMP/technical plan, and the management of specifications.
14. Financial Management concepts including the Cost/Schedule Control System Criteria(C/SCSC), indirect cost management, concepts of Life Cycle Cost, performance measurement, and cost estimating.
15. Integrated Logistics Support (ILS) concepts including an overview of the Logistics Support Analysis (LSA) Process and the ILS plan.
16. The specifics of how to develop and write an ILS plan.
17. Program Management concepts including scheduling, leadership, motivation, the function and structure of a program office, and the use of Security Classification Guides.

18. System Safety concepts of designing safety into defense weapons systems.
19. Test and Evaluation concepts including an analysis of the Test and Evaluation Master Plan (TEMP); development testing, operational testing, and acceptance testing.
20. The specifics of how to develop and write a Test and Evaluation Master Plan (TEMP).
21. The specifics of how to develop and write a Work Breakdown Structure.
22. Reliability and Maintainability (R&M) concepts including survivability/vulnerability and the rationale for having an R&M program in acquisition programs.
23. Group Decision Making concepts including creativity, listening, communication, team building, conducting effective meetings, and problem solving methods.
24. Quality and Productivity concepts including the quality control and quality assurance roles in the acquisition process.
25. Communication Skills including technical writing skills, briefing preparation/presentation, and personnel management.
26. Technical concepts including basic electronics, computer hardware/software, mechanics, dynamics, and materials.
27. Training concepts including the development of training and training support for acquisition programs.
28. Civil Engineering concepts including development of facilities requirements data and facilities in support of weapons systems.

III. METHODOLOGY

Introduction

This chapter describes the design for this research study, and the methodology used to obtain and analyze the data. Separate sections of this chapter describe the population of interest, the test instrument used, and the techniques used to analyze the data.

Population of Interest and Test Samples.

The population of interest for this research is personnel taking the training courses that a junior acquisition officer requires for career progression. This includes officers with a duty AFSC of 272x (Acquisition Project Officer) or 271x (Acquisition Management Officer) and the other personnel taking the same training courses as the junior acquisition officer. These other personnel are composed of civilians and military with other AFSC's, and are of interest in comparing their attitudes/perceptions with the junior acquisition officer.

This research could not consider the total population of these "other" personnel when selecting a sample for data gathering. The reason is that the specific make-up of this population is unknown and could very well be changing from year to year. Therefore, a required sample size to achieve a particular confidence level was not computed. Instead, it was determined to draw the sample from the acquisition

training courses scheduled during the period of time available for data gathering. In this sense, this research can be considered a "pilot study" for further research in this area.

As described in chapter 1, the 2721 and 2724 AFSC applies primarily to company grade officers. Acquisition training at this stage of an officer's career generally consists of completion of SAS 001/ SYS 100, SYS 200 or equivalent, and two additional acquisition related specialty courses. The training courses used for obtaining data were SYS 100, SYS 200 and two additional acquisition related specialty courses (SYS 225 and SYS 227). The specific classes surveyed were chosen on the basis of schedule availability, and the expected number of 27xx's in that particular class. Only classes that were scheduled during the period of data gathering were considered, and those were further limited to the classes expected to provide the largest number of 27xx's. Additionally, only classes given in residence at AFIT were chosen so that surveys could be administered and results obtained in a time for adequate data analysis.

Test Instrument

A survey approach was chosen for this research because no other data was found to adequately answer the research questions (Reference Appendix A). Past course critiques were looked at as a possible data source, but these provided only limited and vague comments as to the overall quality of

the course, quality of instruction, and whether or not the course objectives were met. Additionally, it was not possible to tell from the critiques whether any differences or similarity between groups existed. One significant trend noted from the SYS 200 course critiques is the consistent positive feedback on the group exercises. This is one reason the exercises were considered as separate subject areas in the survey.

An attitudinal survey was used to accumulate data regarding the perceptions of individuals taking classes that met the schedule and composition criteria above. The survey was administered to the following classes:

Table 1
List of Classes Surveyed

CLASS	# SURVEYED

SYS 200, Acquisition Planning and Analysis	55
SYS 200, Acquisition Planning and Analysis	60
SYS 100, Introduction to Acquisition Management	16
SYS 227, Financial Management in Weapons Sys Acquisition	28
SYS 225, Acquisition Logistics	42

The survey consisted of a series of questions designed to provide information about how important a particular training subject is for effective job performance. The survey used two different scales, one designed to provide subject ranking information and the other to provide

information on whether or not a subject area should be taught prior to an individual beginning his/her job. The first scale used was the Likert type shown in Table 2 below:

Table 2

An Example of Scale 1 Used in the Survey

(1)	(2)	(3)	(4)	(5)
STRONGLY AGREE	MODERATELY AGREE	NEITHER AGREE OR DISAGREE	MODERATELY DISAGREE	STRONGLY DISAGREE

The second scale used is shown in Table 3 below:

Table 3

An Example of Scale 2 Used in the Survey

The information listed in the question is:

- (1) Not relevant to my job.
- (2) Not needed to meet minimum job performance criteria, but is needed for maximizing job performance/competency.
- (3) Needed to meet minimum job competency/performance criteria.
- (4) Needed to meet minimum job competency/performance criteria and is needed prior to job entry.

This second scale was primarily intended to provide information as to which subject areas needed to be taught prior to job entry, and to provide information on the significance of subject area rankings if the first scale proved inadequate. The first scale did indeed prove inadequate for answering investigative questions 3 and 4.

The inadequacy is discussed in the Results chapter. The second scale also served as an internal validity check when used to compare subject rankings with rankings obtained using the first scale. If the scales are both accurate reflections of the relative importance of training subject areas to those individuals surveyed, then the ranking results should be approximately the same for each scale. For example, if the subject area Group Decision Making scored significantly higher than the other subjects on scale 1, then it should also score significantly higher than the others when using scale 2.

Data Analysis

The answers to the survey questions were recorded on Optical scan sheets for ease of data analysis. Several different methods and techniques were needed to analyze the data for the investigative questions and demographics. The demographics data was obtained using a 'frequency' command sequence in the Statistical Package for the Social Sciences (SPSS). The frequency count data for the analysis of the investigative questions came from the use of this same command sequence and are included in Appendix B.

The data analysis of investigative question 1 (the relative ranking of subject areas) was accomplished using a spreadsheet and the frequency counts established using SPSS. A mean score was computed for each subject area, and the subject areas were then ranked from highest to lowest. The

score was computed individually for all subject areas using first Scale 1 and then Scale 2. The result was two rankings, one from the responses using scale 1 and one from the responses using scale 2. For scale 1 the following equation and the frequencies obtained for survey Questions 12 through 39 were used to determine the score for each subject area:

$$\text{score} = [(Ax5) + (Bx4) + (Cx3) + (Dx2) + (Ex1)] / N \quad (1)$$

where: A = number of Strongly Agree responses
 B = number of Moderately Agree responses
 C = number of Neither Agree or Disagree responses
 D = number of Moderately Disagree responses
 E = number of Strongly Disagree responses
 N = total number of responses

Scale number 2 was also used to generate rankings (to be compared with the rankings obtained from scale number 1). The same formula was used to calculate a mean score with the exception that there were four categories of responses (not relevant to my job; needed to maximize job performance; needed to meet minimum job performance standards; needed prior to job entry) instead of five.

Investigative question 2,3, and 4 all used the same data analysis technique applied in a slightly different manner. The technique used for all four was the chi-square test of homogeneity. The chi-square test of homogeneity

tests the null hypothesis that "the proportion of individuals in category j is the same for each population, and that is true for every category" (6:583). The test statistic is the chi-square based on observed and estimated expected contingency table cell counts. The "j" categories tested are the different categories of responses to the survey (Strongly Agree, etc.). The populations tested for homogeneity are defined for each investigative question. The estimated expected cell counts are calculated using "eq (2)" shown below:

$$\begin{aligned} \text{estimated expected cell count for cell (i,j)} = \\ (\text{ith row total}) * (\text{jth column total}) / N \end{aligned} \quad (2)$$

where: N = the total number of responses

The test can be safely applied as long as the estimated expected cell count is greater or equal to five for each cell (6:583). This is where scale 2 becomes important, because scale 1 does not meet this criteria using the data obtained for investigative question 3, and 4.

Investigative Question 2 determined whether the rankings provided from Investigative Question 1 have some subject areas that are ranked significantly higher (or lower) than the others. In this case the two populations being tested for homogeneity are each individual subject area against the rest of the subject areas taken as a group. The characteristic of interest is the response to how important

a particular subject area is to an individuals job performance. The result is a list of subject areas that rank significantly higher and significantly lower than the rest. This test was performed twice (once for each scale). A sample calculation is shown in the results chapter for clarity. A significance level of $\alpha = .01$ was used for both tests. The degrees of freedom used to determine the critical chi-square value were four and three (for scale 1 and scale 2 respectively). This gave a critical chi-square value of 13.22 and 11.34 for scale 1 and scale 2 respectively.

The chi-square test of homogeneity was used in a slightly different manner to provide answers to investigative questions 3 and 4. Investigative question 3 measured differences in subject area rankings between acquisition officers and others taking the same training, while investigative question 4 measured differences in subject area rankings between those performing SPO duties and those not performing SPO duties. In this case the populations being tested for homogeneity are the 27xx versus non-27xx (investigative question 3), and the SPO versus non-SPO groups (investigative question 4). The characteristic of interest is the responses to how important a particular subject area is to an individuals job performance. Each question was tested individually, with the result being a list of subject areas scored significantly differently

between the 27xx and non-27xx personnel, and those ranked significantly different between the SPO and non-SPO group. A sample calculation is shown in the results for clarity.

Investigative questions 5 and 6 determined which subject areas, if any, are perceived to be needed by the 27xx and SPO personnel prior to beginning his/her assignment. To answer this question the subject areas were ranked for the 27xx and the SPO personnel in the same manner used for Investigative question 1. The significantly higher ranked subject areas (determined as in IQ 2) were then examined to see if they met the criteria to be considered a subject area "Needed to meet minimum job competency/performance criteria and is needed prior to job entry". The criteria to be met is based on the percentage of responses for a particular question that fall in the category "Needed to meet minimum job competency/performance criteria" and the category "Needed to meet minimum job competency/performance criteria and is needed prior to job entry". To meet this criteria, the percentage of responses to the "needed prior" category must greater than 30 percent, and the combined percentage of responses to both the "needed to meet minimum" and "needed prior" categories must be greater than 70 percent.

IV. Results

Introduction/Demographics

This chapter presents the results obtained using the methodology described in the last chapter. The response rates of the classes surveyed are first presented, followed by the demographics of the respondents, and finally the investigative questions are answered. The response rates are presented in Table 4 below.

Table 4
Survey Response Rates

CLASS	SURVEYED	RESPONSES
SYS 200-1	55	55
SYS 200-2	60	36
SYS 100	16	16
SYS 227	28	16
SYS 225	42	22

In the first SYS 200 class and the SYS 100 class it was possible to administer the survey during class time, hence the perfect response rates.

The demographics information is presented in Table 5 on the following page. Of particular interest in answering the investigative questions was the information on whether or not an individual had a 27xx AFSC, and whether or not an individual was involved in SPO work. The other information

is included to present a more complete picture of the sample for the interested reader.

Table 5

Demographics Information on the Survey Respondents

RANK	01-03	04-05	CIVILIAN		
FREQUENCY	71	22	52		
PERCENTAGE	49	15.1	35.9		
AFSC	272X	271X	OTHER		
FREQUENCY	31	11	103		
PERCENTAGE	21.4	7.5	71		
DIVISION	SD	ASD	ESD	AD	OTHER
FREQUENCY	7	89	5	2	42
PERCENTAGE	4.8	61.4	3.4	1.4	29
SPO WORK	YES	NO			
FREQUENCY	86	54			
PERCENTAGE	59.3	37.2			
ACADEMIC	BS	MS	PHD		
FREQUENCY	68	62	1		
PERCENTAGE	46.9	42.8	.7		
PME	NONE	SOS	ISS	SSS	
FREQUENCY	60	45	25	8	
PERCENTAGE	41.4	31	17.2	5.5	

Of note from the demographics table above is the total number of 27xx respondents, non 27xx respondents, respondents doing SPO work, and respondents not doing SPO

work (42,103,89,54 respectively). For answering investigative question 1, the responses from each of these four categories were used to rank the subject areas from most needed to least needed.

Investigative Question 1

The purpose of Investigative Question 1 was to determine the relative ranking (in terms of need for effective job performance) of acquisition training subject areas typically received by a junior acquisition officer. Two different rankings were established using the mean scoring method presented in the last chapter. The two rankings relate to the total sample frequencies of responses for scale 1, and scale 2. A sample calculation used in scoring question #12 is shown below:

Table 6

A Sample Calculation Used in Ranking Subject Areas

$$\text{Score} = [(Ax5) + (Bx4) + (Cx3) + (Dx2) + (Ex1)]/N \quad (1)$$

where: A = number of Strongly Agree Responses = 67
B = number of Moderately Agree Responses = 57
C = number of Neither Agree/Disagree = 10
D = number of Moderately Disagree Responses = 6
E = number of Strongly Disagree Responses = 4
N = number of responses to this question = 144

$$\text{Score} = [(67x5) + (57x4) + (10x3) + (6x2) + (4x1)]/144 = 4.23$$

Carrying out the arithmetic yields a score of 4.23 for Question 12. Question 12 referred to the perceived need for the subject area Acquisition Management, and hence the score of 4.23 was given to that subject area. The same equation was applied to each question and the rankings shown in Tables 7 and 8 are the result.

Table 7

Subject Area Rankings Based on All Responses- Scale 1

RANK	QUESTION	SUBJECT AREA
* 1	36	Communication Skills
* 2	34	Group Decision Making
* 3	21	Contracting
4	13	Acquisition Strategy
* 5	12	Acquisition Management
6	15	Budgeting/Funding
* 7	22	Excercise- RFP/SOW/CDRL
8	28	Program Management
9	23	Configuration Management
10	20	Contract Management
11	18	Competition
12	33	Reliability and Maintainability
13	26	ILS Concepts
14	37	Technical Concepts
15	25	Financial Management
16	30	Test and Evaluation
17	24	Engineering/Technical Management
18	19	Computers/SW
19	32	Excercise- WBS
20	17	Manufacturing/Production
* 21	35	Quality/Productivity
* 22	38	Training
23	14	Excercise- Acquisition
* 24	16	Excercise- POM/BES
* 25	29	Safety
* 26	39	Civil Engineering
* 27	31	Excercise- TEMP
* 28	27	Excercise- ILS Plan

* - indicates significant difference in proportion of responses between the question indicated and the group of subject areas taken as a whole.

This ranking shows the perceived relative importance of subject areas on job performance for all of the survey respondents taken as a whole based on the responses to the questions using scale 1. The results from the other half of investigative question (using scale 2) are presented in Table 8 below:

Table 8

Subject Area Rankings Based on All Responses -Scale 2

RANK	QUESTION	SUBJECT AREA
* 1	64	Communication Skills
* 2	62	Group Decision Making
* 3	49	Contracting
* 4	56	Program Management
* 5	50	Excercise- RFP/SOW/CDRL
6	40	Acquisition Management
7	48	Contract Management
8	41	Acquisition Strategy
9	51	Configuration Management
* 10	65	Technical
11	43	Budgeting/Funding
12	46	Competition
13	53	Financial Management
14	60	Excercise- WBS
15	52	Engineering/Technical Management
16	61	Reliability and Maintainability
* 17	58	Test and Evaluation
18	54	ILS concepts
19	47	Computers/SW
20	63	Quality/Productivity
21	44	Excercise- POM/BES
22	66	Training
* 23	57	Safety
* 24	42	Excercise-Acquisition
* 25	55	Excercise- ILS plan
* 26	45	Manufacturing/Production
* 27	59	Excercise- TEMP
* 28	39	Civil Engineering

The asterisk comes as a result of answering investigative question 2. and represents whether or not the proportion of responses to a particular question are significantly different than the proportion of responses to the overall group of questions. This will be discussed in the next section, investigative question 2.

Investigative Question 2

As specified in the methodology chapter, this question was designed to answer which, if any of the subject areas are ranked significantly higher or lower than the rest. A sample calculation (Table 9) will serve to illustrate the procedure specified in the methodology chapter. For this example, the computed chi-square value exceeds the critical value (13.22) for $\alpha = .01$ with four degrees of freedom, meaning reject the null hypothesis that the proportion of responses from the two populations tested are homogeneous (i.e. proportion of responses for question 36 is statistically different from the proportion of responses for the rest of the questions). This same procedure was used to test each question (12 through 39) individually against the rest of the questions. The procedure was then used to test the scale 2 questions (40 through 67) for significantly higher or lower rankings. The only difference for scale 2 was that the degrees of freedom was three instead of four. The results are shown in Table 10 and Table 11.

Table 9

Example of Test of Homogeneity Calculation for Question 36

OBSERVED FREQUENCY OF RESPONSES

	SA	MA	N	MD	SD
QUESTION 36	104	27	3	0	10
TOTAL	1544	1355	528	248	338

Where SA= STRONGLY AGREE, MA = MODERATELY AGREE
 N= NEITHER AGREE OR DISAGREE, MD= MODERATELY DISAGREE
 SD= STRONGLY DISAGREE

ESTIMATED EXPECTED FREQUENCIES

	SA	MA	N	MD	SD
QUESTION 36	57.1	47.9	18.4	8.6	12.1
TOTAL	1590	1334	512	239	336

CHI- SQUARE SCORES

	SA	MA	N	MD	SD
QUESTION 36	38.6	9.1	12.9	8.6	.35
TOTAL	1.4	.34	.46	.31	.01

TOTAL CHI-SQUARE = 72

The estimated expected values are calculated using the equation :

$$\text{expected estimate} = (\text{row total}) \times (\text{column total}) / N \quad (2)$$

The chi-square values are then computed using

$$\frac{(\text{observed} - \text{expected})^2}{\text{expected}} = \text{chi-square test statistic} \quad (3)$$

Table 10

Subject Areas Scored Significantly Higher than the Rest

SUBJECT AREA - SCALE 1	SUBJECT AREA - SCALE 2
COMMUNICATION SKILLS	COMMUNICATION SKILLS
GROUP DECISION MAKING	GROUP DECISION MAKING
CONTRACTING	CONTRACTING
EXCERCISE-RFP/SOW/CDRL	EXCERCISE- RFP/SOW/CDRL
ACQUISITION MANAGEMENT	PROGRAM MANAGEMENT

As can be seen in Table 10, there are four subject areas ranked significantly higher than the rest on both scales. These subject areas are Communication, Group Decision Making, Contracting, and the RFP/SOW/CDRL Excercise. Additionally, Acquisition Management ranked significantly higher on Scale 1, and Program Management ranked significantly higher on Scale 2. Based on this information, this researcher would be very reluctant to cut any of these areas out of the current acquisition training and would consider all of these as candidates for increased emphasis. In a similar manner, Table 11 shows the subject areas ranked significantly lower than the rest.

Table 11

Subject Areas Scored Significantly Lower than the Rest

SUBJECT AREA - SCALE 1	SUBJECT AREA - SCALE 2
EXCERCISE - ILS PLAN	EXCERCISE - ILS PLAN
EXCERCISE - TEMP	EXCERCISE - TEMP
CIVIL ENGINEERING	CIVIL ENGINEERING
SAFETY	SAFETY
EXCERCISE - POM/BES	MANUFACTURING/PRODUCTION
TRAINING	EXCERCISE- ACQUISITION
QUALITY/PRODUCTIVITY	

Table 11 shows four subject areas ranked significantly lower than the rest on both scales. These subject areas are the ILS Plan Exercise, the TEMP exercise, Civil Engineering, and Safety. Additionally, there were three more ranked significantly lower than the rest using scale 1 and two more using scale 2. For scale 1, these areas are the POM/BES exercise, Training, and Quality/Productivity. Similarly, for scale 2 they are Manufacturing/Production and the Acquisition Exercise.

Investigative Question 3

This question attempted to determine whether or not there are significant differences between the subject area rankings of Air Force Project Officers (27xx's) and others taking the same training. The methodology for determining this was a two step process. First, the subject areas were ranked for the 27xx's and the non 27xx's using the same scoring method as in investigative question 1. The next step use the chi-square test of homogeneity to test the responses of 27xx's against the responses of the non-27xx's to determine if there were significant differences. The results of the first step (ranking) are shown below in Table 12 on the next page. The second step of answering investigative question 3 was to determine if there were significant differences between the responses of 27xx's and non-27xx's. Each question was tested for differences in the

responses between the 27xx and the non-27xx. Only the rankings from scale 2 could be used because the expected estimate count in some cells using scale 1 were less than 5. The test can safely be applied only if the expected estimate for each cell is greater than or equal to five (6:584).

Table 12

Subject Area Rankings for 27xx and Non-27xx Personnel

27XX		NON-27XX
RANK	SUBJECT AREA	SUBJECT AREA
1	Communication Skills	Communication Skills
2	Group Decision Making	Group Decision Making
3	Contracting	Contracting
* 4	Technical	Excercise-RFP/SOW/CDRL
5	Program Management	Program Management
6	Excercise-RFP/SOW/CDRL	Acquisition Management
7	Contract Management	Contract Management
8	Acquisition Strategy	Configuration Management
9	Budgeting/Funding	Acquisition Strategy
10	Acquisition Management	Budgeting/Funding
11	Configuration Management	Technical
12	Test and Evaluation	Financial Management
13	Competition	Engineering/Technical Mgt
14	Financial Management	Competition
15	Excercise- WBS	Reliability/Maintainability
16	Reliability/Maintainability	Excercise-WBS
17	Quality/Productivity	ILS concepts
18	ILS concepts	Computers/SW
19	Engineering/Technical Mgt	Test and Evaluation
20	Excercise- POM/BES	Quality/Productivity
21	Computers/SW	Excercise-POM/BES
22	Safety	Training
23	Training	Safety
24	Excercise- Acquisition	Excercise- Acquisition
25	Excercise- TEMP	Excercise - ILS plan
26	Excercise- ILS Plan	Manufacturing/Production
27	Civil Engineering	Excercise- TEMP
28	Manufacturing/Production	Civil Engineering

* - indicates subject areas scored significantly different between 27xx and non- 27xx groups.

The results shown in Table 12 show that only one subject area was responded to significantly differently between the 27xx and non-27xx groups at the significance level $\alpha = .01$. This subject area is Technical Concepts and is indicated with an asterisk in Table 12.

Investigative Question 4

This question attempted to determine whether or not there are significant differences between the subject area rankings of those personnel working in SPO's and those personnel not working in SPO's. The response to survey question 4, "Do you work in a SPO and have responsibility for assisting in the planning or management of a system, subsystem, or equipment acquisition program" distinguished who is working in a SPO and who is not. The methodology was the same used in answering investigative question 3. The results are shown in Table 13 on the following page.

The results show 14 of 28 subject areas scored significantly different between SPO and non-SPO groups. This is in marked contrast to the 27xx and non-27xx groups which showed a significant difference in the ranking of only one area, Technical Concepts. It should be noted that several subject areas have the same relative ranking between SPO and non-SPO groups (e.g. Manufacturing/Production), but still test for significant differences. This is because the SPO group typically scored all subject areas higher than the non-SPO group.

Table 13

Subject Area Rankings for SPO and Non-SPO Personnel

SPO		NON-SPO
RANK	SUBJECT AREA	SUBJECT AREA
1	Communication Skills	Communication Skills
2	Group Decision Making	Group Decision Making
* 3	Program Management	Contracting
4	Contracting	Acquisition Management
* 5	Excercise-SOW/RFP/CDRL	Excercise-SOW/RPF/CDRL
* 6	Acquisition Strategy	Configuration Management
7	Acquisition Management	Contract Management
8	Contract Management	Budgeting/Funding
9	Configuration Management	Technical
10	Budgeting/Funding	Program Management
* 11	Test and Evaluation	Acquisition Strategy
* 12	Financial Management	Competition
* 13	ILS concepts	Training
* 14	Excercise-WBS	Reliability/Maintainability
* 15	Reliability/Maintainability	Financial Management
16	Technical	Quality/Productivity
* 17	Engineering/Technical Mgt	Computers/SW
18	Competition	Test and Evaluation
19	Computers/SW	ILS concepts
20	Quality/Productivity	Excercise-POM/BES
21	Excercise-POM/BES	Excercise- WBS
* 22	Excercise-Acquisition	Engineering/Technical Mgt
23	Training	Safety
* 24	Excercise-ILS	Excercise-ILS
25	Safety	Civil Engineering
* 26	Excercise- TEMP	Excercise-Acquisition
* 27	Manufacturing/Production	Manufacturing/Production
28	Civil Engineering	Excercise-TEMP

* - indicates subject areas scored significantly different between the SPO and non-SPO respondents.

Investigative Question 5

This question investigated "Which subject areas, if any, are perceived by the junior acquisition officer (27xx) as being needed prior to beginning an assignment as an Acquisition Project Officer?" In answering this question,

the frequency counts for 27xx personnel (Appendix B) were used to calculate the percentage of responses to the categories of 'needed to meet minimum job competency/performance criteria' and 'needed to meet minimum job competency/performance criteria and is needed prior to job entry'.

As described in the Methodology chapter, for a subject area to be considered as needed prior to job entry it must satisfy two criteria. First, the percentage of responses to the 'needed prior' category must be greater than 30 percent. Second, the combined percentage of responses to 'needed to meet minimum' and 'needed prior' categories must be greater than 70 percent. Two questions met these criteria, questions 64, and 62. These questions correspond to the subject areas Communications Skills, and Group Decision Making.

Investigative Question 6

This question is identical to question 5 except that it answers which subject areas, if any, are perceived by the SPO personnel as being needed prior to beginning an assignment in a SPO. The methodology is identical to that used for question 5. The result here is three subject areas that SPO personnel surveyed feel are needed prior to job entry. These are Communication Skills, Group Decision Making, and Program Management.

V. Discussion/Recommendations

This chapter highlights and discusses the results of each investigative question, makes specific recommendations based on the results, and then discusses the need for further research in this area. The chapter is organized to discuss the investigative questions in order, beginning with question 1.

Discussion

Question 1 ranked the subject areas from those being perceived by the survey respondents as most needed to those least needed. This ranking used the total surveyed population and provided a relative ranking based on the score calculated for scale 1 and for scale 2. It is of significant note that even the lowest ranking subject area still had an average score of 3.9, putting the average response just below 'moderately agree' that these concepts are necessary to accomplish the individual's job. This is a very favorable comment as to the overall content of the acquisition training courses, and seems to echo the findings of the research discussed in chapter 1 (13).

For scale 2, the average score of 2.4 puts the average response in between the categories of 'needed for maximizing job performance/competency' and 'needed to meet minimum job competency/performance criteria'. The bottom line of the results of the ranking done in question 1 is that none of

the subject areas tested can be considered unnecessary in the training of the junior acquisition officer. But, this represents the view of all respondents (including non-SPO and non- 27xx personnel), and the acquisition training courses are really geared toward SPO/27xx personnel. Investigative Questions 3,4,5,and 6 addressed the specific needs of SPO versus non-SPO and 27xx versus non 27xx personnel.

Investigative Question 2 addressed the relative rankings established in Investigative Question 1 to determine which subject areas were scored significantly higher and significantly lower than the rest. The areas that scored significantly higher were shown in Table 10 and are repeated below;

1. Communication Skills- includes technical writing skills, briefing preparation/presentation, and personnel management.
2. Group Decision Making- includes concepts of creativity, listening, conflict management, team building, conducting effective meetings, and problem solving methods.
3. Contracting- includes the concepts of RFP, SOW, SSP, contract types, incentive contracting, the negotiating process, and contract pricing.
4. Excercise(RFP/SOW/CDRL)- the specifics of how to develop and write a RFP, SOW, and/or SSP.

These represent subject areas that require increased, or at least continued emphasis in the training of acquisition personnel, especially if the training is designed to satisfy the needs of all personnel being trained. These represent the subject areas perceived as most needed for job accomplishment of those surveyed.

Similarly, the subject areas scored significantly lower than the rest (repeated from Table 11) are Civil Engineering, System Safety, and the ILS Plan Exercise. If the training were designed to satisfy the needs of all personnel (SP0, non-SP0, 27xx, non-27xx), these are the areas where emphasis should be decreased, or at least not increased. Additionally, if cuts had to be made in the training courses, these would be prime candidates to be cut based on the total (SP0, non-SP0, 27xx, non-27xx) sample surveyed. But, the training is really designed to satisfy the needs of acquisition personnel, the subject of investigative questions 3 through 6.

Investigative question 3 separated the total population surveyed into 2 groups; 27xx personnel and non-27xx personnel. The purpose of this question was to determine if there were significant differences in the scoring between the 2 groups. Of the 28 subject areas tested, only one, Technical Concepts was scored significantly different between the two groups. The 27xx group scored the area of Technical Concepts significantly higher than the non-27xx group. With this one exception though, these two groups are

essentially homogenous with respect to how they rate 27 of the 28 subject areas. The implication of this for follow-on research is not to use the 27xx group as a sample because the SPO/non-SPO grouping provides more applicable information as to the relative ranking of subject areas. This is the grouping used for the results of investigative question 4.

Investigative question 4 was similar to investigative question 3, except the two groups being compared were those who "work in a SPO and have responsibilities for assisting in the planning or management of a system, subsystem, or equipment acquisition program" and those who do not. The results show 14 of the 28 subject areas scored significantly higher for the SPO group than the non-SPO group (see Table 13).

In general, the SPO personnel scored all subject areas higher than the non-SPO personnel, with an average score of 4.1 for SPO personnel versus 3.6 for non-SPO personnel. For SPO personnel this average score equates to a response between "moderately agree" and "strongly agree" that the subject areas are needed for their job. This indicates that the training courses have been designed to satisfy the needs of the SPO personnel, and in general are doing a good job of it. The top five subject areas for the SPO group were Communications Skills, Group Decision Making, Program Management, Contracting, and the SOW/RFP/CDRL exercise.

Also of significant note are the areas that were scored the same between the SPO and non-SPO groups.

The SPO and non-SPO groups both scored the subject areas of Contracting, Group Decision Making, and Communication Skills significantly higher than the rest. This indicates that both groups perceive a strong need for these subject areas for accomplishing their jobs. Therefore, even when the acquisition training is designed for SPO personnel, these subject areas can provide direct benefit to the current jobs of the non-SPO personnel as well. These areas need continued (or increased) emphasis in the training of junior acquisition officers.

Similarly, the System Safety and Civil Engineering subject areas show a uniform low level (between SPO and non-SPO groups) of need to the junior acquisition officer. Additionally, there are two subject areas that repeat from investigative question 2 as being significantly lower than the rest, but are scored significantly higher by the SPO group than the non-SPO group. These two are the ILS Plan Exercise and Manufacturing/Production concepts. These four represent the subject areas perceived as least needed by the SPO personnel surveyed. Even so, the average scores for these subject areas put them slightly above the category "Not needed to meet minimum job performance criteria, but is needed for maximizing my job performance/competency". The point is, these subject areas are needed, although less so than the others. Investigative question 5 examined which

subject areas the 27xx personnel perceive as needed prior to beginning an assignment as a 27xx. Two subject areas (Communications Skills and Group Decision Making) scored significantly different from the rest based on the percentage of responses meeting the criteria to be considered a "needed prior to job entry" subject area. Investigative question 6 examined the same question only for SPO personnel instead of 27xx personnel. The analysis showed three subject areas as needed prior to job entry; Communication Skills, Group Decision Making and Program Management. If these are needed prior to job entry, then they certainly should be emphasized in early acquisition training. Specific recommendations for early acquisition training courses are presented below.

Specific Recommendations

The specific recommendations presented in this section are broken down by training course. The training courses discussed are SAS 001/SYS 100, SYS 200, and the PCE acquisition related specialty courses.

The SAS 001 and SYS 100 as discussed in chapter 2 are both introductory acquisition courses open to acquisition personnel and others. As seen throughout this thesis, there are three subject areas that need emphasis for all personnel taking the training of the junior acquisition officer. These are Communications Skills, Group Decision Making, and Contracting. The Contracting subject area is adequately

covered in both SAS 001 and SYS 100. Both courses however, need to increase emphasis in Group Decision Making (creativity, listening, conflict management, team building, conducting effective meetings, and problem solving methods). It is strongly recommended that a block of instruction be added to both courses emphasizing the importance of these areas to an acquisition manager. In regards to Communication Skills (technical writing, briefing, personnel management) SYS 100 seems to be on the right track with a full exercise on the communication process in management. It is recommended that SAS 001 add a similar exercise.

SYS 200, Acquisition Planning and Analysis, is "designed to prepare program/project managers for basic management level task accomplishment in a program office". It is recommended that SYS 200 follow the lead of SYS 400 in giving increased emphasis to Communications Skills, and Group Decision Making. These appear to be just as important to the job performance of the junior acquisition officers as to the middle management officers taking SYS 400. The many practical SPO exercise of SYS 200 are a logical place to increase the emphasis on these two subject areas. Since the exercises are accomplished in small groups anyway, an introductory lesson on the concepts of Group Decision Making prior to the exercises could serve to enhance exercise completion and reinforce the concepts of Group Decision Making. Additionally, to enhance Communication Skills,

it is recommended that each group present their exercise solutions in a briefing to the class.

If the recommendations above cannot be implemented because of constraints on the SYS 200 course length, then it is recommended that the ILS Plan Exercise be deleted to make room. This exercise scored consistently lower than the rest of the SYS 200 subject areas and is more appropriately covered in another course anyway. The ILS Plan exercise is more appropriate for SYS 225, Acquisition Logistics.

It is particularly important for the acquisition training courses to emphasize group decision making concepts because there are five Group Decision Making courses that have been dropped in the AFIT Professional Continuing Education 1988-89 catalog (17). These are OSP 076, Creativity; OSP 077, Listening; OSP 078 Communication; OSP 079, Conflict Management; and OSP 085, Conducting Effective Meetings. These courses have been dropped primarily because of a lack of requests to fill the classes (11). One explanation might be that junior acquisition personnel can not convince their supervisors to send them away for three days for one of the courses listed above. Perhaps if all five of the courses listed above were consolidated into a single course the requests would be sufficient to fill the courses. The results of this initial study show these courses are needed not only for the acquisition personnel, but for others as well.

Recommendations for Further Research

It is recommended that this research be continued with modifications to both the survey instrument and the survey sample. The survey should be rewritten to include only one scale, preferably the second. Removing one scale will cut the survey size in half, and hence allow for two improvements that could not be implemented in this research because of survey size constraints. First, individual subject area operational definitions can be expanded so they are clear even to those who have not received any acquisition training. Secondly, additional subject areas can be broken out of some of the current areas. For example, the area of scheduling techniques could be broken out of the current subject area of Program Management.

In addition to modifications to the survey instrument, the survey sample should be redefined and enlarged. This research, for reasons discussed earlier, could not determine a sample size for particular confidence/reliability calculations. The new sample should be targeted at junior SPO personnel and their supervisors. The supervisor attitudes are to be collected to ensure that the subject areas perceived as being needed by the junior personnel are the same as what their supervisors think they need. It is possible that some junior acquisition personnel do not know what they really need to accomplish their jobs. This new survey should also look at differences and similarities in

attitudes between different product divisions, and civilian
versus military SPO personnel.

Appendix A: Survey on Subjects of Training
For Acquisition Officers

17 MARCH 88

REPLY: LSY (CAPT SMITH)

SUBJECT: SURVEY ON SUBJECTS OF TRAINING FOR ACQUISITION
OFFICERS

TO: AF ACQUISITION PERSONNEL

1. In an ongoing effort to update and improve the training of AF acquisition personnel, it is vital to receive comprehensive feedback on the relative importance of the different subject areas being taught. This is especially true when tightening budgets require a streamlining of course contents.

2. In an effort to systematically reduce the emphasis of the "less important" subject areas, your inputs on the relative importance of subject areas is solicited. The importance of a subject area is to be measured in terms of how important it is to your job performance.

3. Your participation is voluntary, and your responses will be anonymous. Please do not sign your name or organization anywhere on the survey. To complete the survey, identify the appropriate numerical response to each question on the optical scan answer sheets provided.

4. Please complete the survey, and return both the survey and answer sheet to Capt Smith.

SURVEY ON
SUBJECTS OF TRAINING
FOR ACQUISITION OFFICERS

Instructions

Answer all items by either circling the appropriate response to each question, or by writing your numerical response in the space provided below each question. Select only one response for each item and clearly erase any responses you change. If for any item you do not find a response that fits your situation exactly, use the one that is closest to the way you feel. Please answer each item as honestly and frankly as possible.

To ensure your response remains anonymous, please do not sign your name on this survey.

Background Information

1. What is your current rank?

- (1) Second Lieutenant
- (2) First Lieutenant
- (3) Captain
- (4) Major
- (5) Lieutenant Colonel

2. What is your current duty AFSC?

- (1) 2721
- (2) 2724
- (3) 2711
- (4) 2716
- (5) Other

3. If you work in Air Force Systems Command, what product division are you assigned to?

- (1) Not Applicable
- (2) SD
- (3) ASD
- (4) ESD
- (5) AD

4. Do you work in a SPO and have responsibilities for assisting in the planning or management of a system, subsystem, or equipment acquisition program?

(1) Yes

(2) No

5. What is your primary academic background?

(1) Technical (ie, engineering, math, or physical science)

(2) Non-technical (ie, humanities, or business related)

(3) Both (two different undergraduate degrees)

6. What is the highest academic degree you have obtained?

(1) Bachelor's

(2) Master's

(3) Doctorate

7. What is the highest level of Professional Military Education that you have completed?

(1) None

(2) SOS

(3) Intermediate Service School

(4) Senior Service School

8. Have you completed SAS 001 or equivalent (AFIT SYS 100 or AFIT SYS 123)?

(1) Yes

(2) No

9. Have you completed AFIT SYS 200 or equivalent (AFIT SYS 223, DSMC-Business Management Course, DSMC- Management of the Systems Acquisition Process)?

(1) Yes

(2) No

10. Have you completed AFIT SYS 400 or equivalent (DSMC- Executive Refresher Course, DSMC- Program Managers Workshop, DSMC- Business Managers Advanced Workshop)?

(1) Yes

(2) No

11. Have you completed the DSMC Program Management Course?

(1) Yes

(2) No

PLEASE USE THE FOLLOWING SCALE FOR QUESTIONS 12 THRU 26:

(1)	(2)	(3)	(4)	(5)
STRONGLY AGREE	MODERATELY AGREE	NEITHER AGREE OR DISAGREE	MODERATELY DISAGREE	STRONGLY DISAGREE

12. Understanding Acquisition Management concepts (including the phases in the weapon system acquisition life cycle; the DAB process and the Defense Acquisition Executive role/responsibility) is necessary to accomplish my job.

13. Understanding Acquisition Strategy and planning concepts (including the acquisition plan, multiyear procurement and preplanned product improvement) is necessary to accomplish my job.

14. Understanding the specifics of how to develop and write an Acquisition Plan is necessary to accomplish my job.

15. Understanding Budgeting and Funding concepts (including the planning, programming and budgeting system; cost estimating methodologies; incremental funding and full funding concepts) is necessary to accomplish my job.

16. Understanding the specifics of how to develop and write a Program Objectives Memorandum and/or Budget Estimate Submission is necessary to accomplish my job.

17. Understanding Manufacturing and Production concepts (including an overview of the declining industrial base problem; the IMIP impact on production cost and quality; and other manufacturing management initiatives) is necessary to accomplish my job.

18. Understanding Competition (including competition planning; competition requirements and contracting methods) is necessary to accomplish my job.

19. Understanding Computers and Software concepts (including Mission Critical Computer Resource policy and software cost estimating) is necessary to accomplish my job.

20. Understanding Configuration Management concepts (including an overview of configuration management activities, data management activities, baselines, audits, and the Work Breakdown Structure) is necessary to accomplish my job.

21. Understanding Contracting (including the concepts of request for proposal (RFP); statement of work (SOW); source selection plan; contract types; incentive contracting; the negotiating process) is necessary to accomplish my job.

22. Understanding the specifics of how to develop and write a RFP and/or a SOW/CDRL and/or a SSP is necessary to accomplish my job.

23. Understanding Contract Management concepts (including subcontract management; contract administration; contract changes; contract terminations; Federal Acquisition Regulation (FAR) requirements) is necessary to accomplish my job.

24. Understanding Engineering/Technical Management concepts (including an overview of the systems engineering process; the SEMP/technical plan, and the management of specifications) is necessary to accomplish my job.

25. Understanding Financial Management concepts (including Cost/Schedule Control System Criteria; indirect cost management; Life Cycle Cost; performance measurement; cost estimating) is necessary to accomplish my job.

26. Understanding Integrated Logistics Support concepts (including an overview of the LSA/LSAR Process and the ILS plan) is necessary to accomplish my job.

PLEASE USE THE FOLLOWING SCALE FOR QUESTIONS 27 THRU 44:

(1)	(2)	(3)	(4)	(5)
STRONGLY AGREE	MODERATELY AGREE	NEITHER AGREE OR DISAGREE	MODERATELY DISAGREE	STRONGLY DISAGREE

27. Understanding the specifics of how to develop and write an ILS plan is necessary to accomplish my job.

28. Understanding Program Management concepts (including scheduling techniques, the function and structure of the program office, and the use of Security Classification Guides) is necessary to accomplish my job.

29. Understanding System Safety concepts (including planning in engineering design and product development) is necessary to accomplish my job.

30. Understanding Test and Evaluation concepts (including an analysis of the Test and Evaluation Master Plan(TEMP); development testing, operational testing, and acceptance testing) is necessary to accomplish my job.

31. Understanding the specifics of how to develop and write a Test and Evaluation Master Plan (TEMP) is necessary to accomplish my job.

32. Understanding the specifics of how to develop and write a Work Breakdown Structure is necessary to accomplish my job.

33. Understanding Reliability and Maintainability concepts (including survivability/vulnerability and the rationale for having an R&M program in acquisition programs) is necessary to accomplish my job.

34. Understanding Group Decision Making concepts (including creativity, listening, conflict management, team building, conducting effective meetings, and problem solving methods) is necessary to accomplish my job.

35 . Understanding Quality and Productivity concepts (including the quality control and quality assurance roles in the acquisition process) is necessary to accomplish my job.

36. Understanding Communication Skills (including technical writing skills, briefing preparation/presentation, and personnel management) is necessary to accomplish my job.

37. Understanding Technical concepts (including basic electronics, computer hardware/software, mechanics, dynamics, materials) is necessary to accomplish my job.

38. Understanding Training concepts (including the development of training and training support for acquisition programs) is necessary to accomplish my job.

39. Understanding Civil Engineering concepts (including development of facilities requirements data and facility construction in support of weapons systems acquisition) is necessary to accomplish my job.

PLEASE USE THE FOLLOWING SCALE FOR QUESTIONS 40 THRU 57:

The information listed in the question is :

- (1) Not relevant to my job.
 - (2) Not needed to meet minimum job performance criteria, but is needed for maximizing my job performance/competency.
 - (3) Needed to meet minimum job competency/performance criteria.
 - (4) Needed to meet minimum job competency/performance criteria and is needed prior to job entry.
- -----

40. Acquisition Management concepts including the phases in the weapon system acquisition life cycle; the DAB process; the Defense Acquisition Executive role and responsibility.

41. Acquisition Strategy and planning concepts including the acquisition plan, multiyear procurement and preplanned product improvement.

42. Acquisition Strategy Exercise. Analysis of and instruction in writing an Acquisition Plan.

43. Budgeting and Funding concepts including the planning, programming and budgeting system; cost estimating methodologies; incremental funding and full funding concepts.

44. Budgeting and Funding Exercise. Analysis of , and instruction in writing a Program Objectives Memorandum and/or a Budget Estimate Submission.

45. Manufacturing and Production concepts including an overview of the declining industrial base problem; the Industrial Modernization Incentives Program(IMIP) impact on production cost and quality; other manufacturing initiatives.

46. Competition including competition planning concepts; competition requirements and contracting methods in the acquisition process.

47. Computers and Software concepts including Mission Critical Computer Resource policy and software cost estimating.

48. Configuration Management including an overview of configuration management activities, data management activities, baselines, audits and the Work Breakdown Structure.

49. Contracting including the concepts of request for proposal (RFP); statement of work (SOW); source selection plan; contract types; incentive contracting; the negotiating process; contract pricing.

50. Contracting Exercise. Analysis and preparation for writing a RFP and/or SOW/CDRL and/or a SSP.

51. Contract Management concepts including subcontract management; contract administration; contract changes; contract terminations; FAR requirements for completion and delivery schedules.

52. Engineering/Technical Management concepts including subcontract management; contract administration; contract changes; contract terminations.

53. Financial Management concepts including an overview of the Cost/Schedule Control System Criteria; indirect cost management; Life Cycle Cost; performance measurement; cost estimating.

54. Integrated Logistics Support concepts including an overview of the LSA/LSAR Process and the ILS plan.

55. Integrated Logistics Support Exercise. Analysis and preparation of an ILS plan.

56. Program Management concepts including scheduling techniques; the function and structure of the program office; the use of Security Classification Guides; internal and external participants; Congressional oversight and responsibilities.

57. System Safety concepts and planning in the acquisition process.

PLEASE USE THE FOLLOWING SCALE FOR QUESTIONS 58 THRU 67:

The information listed in the question is:

- (1) Not relevant to my job.
 - (2) Not needed to meet minimum job performance criteria, but is needed for maximizing my job performance/competency.
 - (3) Needed to meet minimum job competency/performance criteria.
 - (4) Needed to meet minimum job competency/performance criteria and is needed prior to job entry.
- -----

58. Test and Evaluation concepts including an analysis of the Test and Evaluation Master Plan (TEMP); development testing, operational testing, and acceptance testing.

59. Test and Evaluation Exercise. Analysis and preparation of a Test and Evaluation Master Plan (TEMP).

60. Work Breakdown Structure Exercise. Analysis and preparation of a WBS.

61. Reliability and Maintainability concepts including survivability/vulnerability and the rationale for having an R&M program in acquisition programs.

62. Group Decision Making concepts including creativity, listening, conflict management, team building, conducting effective meetings, and problem solving methods.

63. Quality and Productivity concepts including the quality control and quality assurance roles in the acquisition process.

64. Communication Skills including technical writing skills briefing preparation/presentation, and personnel management.

65. Technical concepts including basic electronics, computer hardware/software, mechanics, dynamics and materials.

66. Training concepts including the development of training and training support for acquisition programs.

67. Civil Engineering concepts including development of facilities requirements data and facility construction in support of weapons systems acquisition.

Comments

Please provide any general comments below, including any general comments on this survey and in particular any important subject areas that may be missing from this survey and/or acquisition training courses.

Appendix B: Survey Frequency Count Data

FREQUENCY DATA FROM ALL SURVEY RESPONDENTS

QUESTION #	RESPONSE CATEGORY					SUM	SCORE
	5-SA	4-MA	3-N	2-MD	1-SD		
12	67	57	10	6	4	144	4.23
13	72	49	13	5	5	144	4.24
14	45	41	27	16	14	143	3.61
15	72	47	12	4	9	144	4.17
16	43	44	22	20	13	142	3.59
17	40	52	27	13	11	143	3.68
18	61	51	14	10	7	143	4.04
19	58	44	17	14	11	144	3.86
20	68	49	9	6	12	144	4.08
21	89	37	3	4	11	144	4.31
22	82	35	7	5	14	143	4.16
23	64	51	12	5	10	142	4.08
24	54	53	15	7	14	143	3.88
25	48	62	16	6	11	143	3.91
26	56	51	16	9	11	143	3.92
27	19	37	38	27	23	144	3.01
28	72	45	12	3	12	144	4.13
29	28	50	37	13	15	143	3.44
30	56	51	14	8	14	143	3.89
31	23	42	42	16	20	143	3.22
32	46	53	18	10	17	144	3.70
33	51	60	16	7	10	144	3.94
34	89	36	9	0	6	140	4.44
35	34	62	27	7	13	143	3.68
36	104	27	3	0	10	144	4.49
37	53	53	23	2	13	144	3.91
38	34	64	23	11	12	144	3.67
39	16	52	46	14	16	144	3.26
AVERAGE							3.877

Where:

SA = Strongly Agree
MA = Moderately Agree
N = Neither Agree nor Disagree
MD = Moderately Disagree
SD = Strongly Disagree

FREQUENCY COUNT DATA FROM ALL RESPONDENTS

RESPONSE CATEGORY

QUESTION	NR	MAX	MIN	PRIOR	SUM	SCORE
40	13	52	52	23	140	2.61
41	17	51	53	22	143	2.56
42	43	52	37	11	143	2.11
43	18	49	59	17	143	2.52
44	35	54	42	12	143	2.22
45	42	63	28	9	142	2.03
46	22	59	44	17	142	2.39
47	27	61	42	13	143	2.29
48	10	62	50	21	143	2.57
49	5	43	65	29	142	2.83
50	13	47	51	30	141	2.70
51	14	52	60	17	143	2.56
52	24	58	46	14	142	2.35
53	20	62	46	15	143	2.39
54	27	55	49	11	142	2.31
55	46	50	37	9	142	2.06
56	11	53	47	32	143	2.70
57	34	64	35	9	142	2.13
58	26	55	49	13	143	2.34
59	50	54	31	8	143	1.98
60	27	55	44	17	143	2.36
61	25	56	49	13	143	2.35
62	7	41	55	40	143	2.90
63	25	67	39	11	142	2.25
64	5	28	59	50	142	3.08
65	22	53	37	33	145	2.56
66	34	61	35	11	141	2.16
67	56	48	28	9	141	1.93
AVERAGE						2.402

WHERE :

NR = Not relevant

MAX = Needed to maximize job performance

MIN = Needed to meet minimum performance criteria

PRIOR = Needed prior to job entry

FREQUENCY COUNT DATA FOR 27XX PERSONNEL

RESPONSE CATEGORIES

QUESTION #	5-SA	4-MA	3-N	2-MD	1-SD	SUM	SCORE
12	24	14	3	2	1	44	4.32
13	25	12	1	2	1	41	4.41
14	16	13	7	2	3	41	3.90
15	26	10	2	1	2	41	4.39
16	10	19	6	4	2	41	3.76
17	9	20	10	2	1	42	3.81
18	24	14	2	2	0	42	4.43
19	18	15	5	3	1	42	4.10
20	22	14	2	1	3	42	4.21
21	30	9	0	1	1	41	4.61
22	26	10	2	2	2	42	4.33
23	19	18	1	1	2	41	4.24
24	13	20	4	2	2	41	3.98
25	14	22	4	1	1	42	4.12
26	17	16	4	2	2	41	4.07
27	3	10	21	4	4	42	3.10
28	28	8	2	1	3	42	4.36
29	5	18	14	3	2	42	3.50
30	19	13	6	3	1	42	4.10
31	9	10	13	6	3	41	3.39
32	13	20	4	2	3	42	3.90
33	10	24	5	1	2	42	3.93
34	29	9	3	0	1	42	4.55
35	10	20	8	1	3	42	3.79
36	34	7	0	0	1	42	4.74
37	14	16	11	0	1	42	4.00
38	8	19	9	3	3	42	3.62
39	3	16	17	3	3	42	3.31
AVERAGE							4.03

FREQUENCY COUNT DATA FOR 27XX PERSONNEL

RESPONSE CATEGORIES

QUESTION	NR	MAX	MIN	PRIOR	SUM	SCORE
40	3	15	14	8	40	2.68
41	2	16	16	7	41	2.68
42	10	17	12	2	41	2.15
43	3	13	20	5	41	2.66
44	6	18	14	3	41	2.34
45	12	20	7	2	41	1.98
46	4	15	17	5	41	2.56
47	6	19	13	3	41	2.32
48	1	16	17	6	40	2.70
49	1	8	22	10	41	3.00
50	2	13	14	11	40	2.85
51	1	18	16	6	41	2.66
52	3	20	17	1	41	2.39
53	3	18	16	4	41	2.51
54	5	17	17	2	41	2.39
55	10	18	12	0	40	2.05
56	3	12	13	13	41	2.88
57	8	19	11	3	41	2.22
58	5	12	18	5	40	2.58
59	12	16	10	3	41	2.10
60	6	15	14	6	41	2.49
61	7	14	16	4	41	2.41
62	1	9	17	14	41	3.07
63	5	17	16	3	41	2.41
64	0	6	16	19	41	3.32
65	1	12	17	11	41	2.93
66	9	19	10	3	41	2.17
67	16	11	12	2	41	2.00
AVERAGE						2.52

FREQUENCY COUNT DATA FOR NON-27XX PERSONNEL

RESPONSE CATEGORIES

QUESTION	5-SA	4-MA	3-N	2-MD	1-SD	SUM	SCORE
12	46	42	7	4	3	102	4.22
13	47	36	12	3	4	102	4.17
14	29	28	20	13	11	101	3.50
15	45	37	10	3	7	102	4.08
16	32	25	16	16	11	100	3.51
17	31	32	17	11	10	101	3.62
18	37	36	13	8	7	101	3.87
19	39	29	12	11	11	102	3.73
20	45	35	7	5	10	102	3.98
21	63	25	2	2	10	102	4.26
22	56	25	5	3	12	101	4.09
23	45	32	13	4	8	102	4.00
24	41	32	11	5	12	101	3.84
25	33	40	12	5	11	101	3.78
26	38	35	11	7	10	101	3.83
27	16	27	17	23	19	102	2.98
28	44	37	10	2	9	102	4.03
29	23	32	23	10	13	101	3.42
30	37	38	8	5	13	101	3.80
31	14	32	29	10	16	101	3.18
32	33	33	14	8	14	102	3.62
33	41	35	11	6	8	101	3.94
34	60	27	6	0	5	98	4.40
35	24	42	19	6	10	101	3.63
36	70	20	3	0	9	102	4.39
37	39	37	12	2	12	102	3.87
38	26	45	14	8	9	102	3.70
39	13	36	29	11	13	102	3.25
AVERAGE							3.81

FREQUENCY COUNT DATA FOR NON-27XX PERSONNEL

RESPONSE CATEGORIES

QUESTION	NR	MAX	MIN	PRIOR	SUM	SCORE
40	10	37	38	15	100	2.58
41	15	35	37	15	102	2.51
42	33	35	25	9	102	2.10
43	15	36	39	12	102	2.47
44	29	36	28	9	102	2.17
45	30	43	21	7	101	2.05
46	18	44	27	12	101	2.33
47	21	42	29	10	102	2.27
48	9	45	33	15	102	2.53
49	4	35	43	19	101	2.76
50	11	34	37	19	101	2.63
51	13	34	44	11	102	2.52
52	21	38	29	13	101	2.34
53	17	44	30	11	102	2.34
54	22	38	32	9	101	2.28
55	36	32	25	9	102	2.07
56	8	41	34	19	102	2.63
57	26	45	24	6	101	2.10
58	20	42	31	8	101	2.27
59	38	38	21	5	102	1.93
60	21	40	30	11	102	2.30
61	18	42	33	9	102	2.32
62	6	32	38	26	102	2.82
63	20	50	23	8	101	2.19
64	5	22	43	31	101	2.99
65	21	39	20	22	102	2.42
66	25	42	25	8	100	2.16
67	40	36	16	7	99	1.90
AVERAGE						2.36

FREQUENCY COUNT DATA FOR SPO PERSONNEL

RESPONSE CATEGORIES

QUESTION	5-SA	4-MA	3-N	2-MD	1-SD	SUM	SCORE
36	62	20	0	0	4	86	4.58
21	56	19	1	1	4	81	4.51
34	58	21	5	0	3	87	4.51
22	60	19	3	2	3	87	4.51
13	49	25	6	2	0	82	4.48
28	54	25	5	1	3	88	4.43
20	50	28	3	2	4	87	4.36
12	42	33	4	3	1	83	4.35
18	45	25	9	6	1	86	4.24
15	43	29	7	2	4	85	4.24
30	39	36	7	3	2	87	4.23
23	39	30	8	2	4	83	4.18
33	33	38	8	2	2	83	4.18
26	37	33	5	5	3	83	4.16
19	42	26	11	6	2	87	4.15
25	36	34	11	2	3	86	4.14
24	36	34	7	3	4	84	4.13
37	36	33	14	1	3	87	4.13
14	35	24	16	7	2	84	3.99
32	32	33	10	7	4	86	3.95
17	28	37	14	9	1	89	3.92
35	20	46	15	2	5	88	3.84
38	22	42	17	2	5	88	3.84
29	16	45	17	5	4	87	3.74
16	26	30	12	11	5	84	3.73
31	15	26	28	7	8	84	3.39
39	7	35	31	8	7	88	3.31
27	13	23	29	13	10	88	3.18
AVERAGE							4.03

FREQUENCY COUNT DATA FOR SPO PERSONNEL

RESPONSE CATEGORIES

QUESTION	NR	MAX	MIN	PRIOR	SUM	SCORE
64	2	13	37	35	87	3.21
62	3	20	35	29	87	3.03
56	1	26	31	28	86	3.00
49	3	19	44	21	87	2.95
50	3	26	33	24	86	2.91
41	3	29	38	18	88	2.81
40	4	28	35	18	85	2.79
48	2	31	33	14	80	2.74
51	6	27	42	13	88	2.70
43	9	26	40	13	88	2.65
58	7	28	33	11	79	2.61
53	6	37	31	14	88	2.60
54	8	31	38	9	86	2.56
60	8	33	34	11	86	2.56
61	8	32	39	9	88	2.56
65	10	35	28	15	88	2.55
52	9	34	32	11	86	2.52
46	10	35	29	12	86	2.50
47	9	38	31	9	87	2.46
63	9	39	30	8	86	2.43
44	18	31	29	10	88	2.35
42	15	37	25	9	86	2.33
66	16	39	22	9	86	2.28
55	17	34	28	6	85	2.27
57	15	40	25	6	86	2.26
59	20	37	22	6	85	2.16
45	16	45	20	5	86	2.16
67	32	27	20	3	82	1.93
AVERAGE						2.57

FREQUENCY COUNT DATA FOR NON-SPO PERSONNEL

RESPONSE CATEGORIES

QUESTION	5-SA	4-MA	3-N	2-MD	1-SD	SUM	SCORE
36	36	9	3	0	4	52	4.40
34	29	17	3	0	5	54	4.20
21	31	14	1	2	6	54	4.15
15	24	18	2	3	5	52	4.02
12	21	22	5	3	3	54	4.02
13	21	19	6	4	3	53	3.96
23	23	17	6	2	5	53	3.96
18	15	26	5	2	6	54	3.78
37	19	18	7	1	9	54	3.69
28	17	21	6	2	8	54	3.69
24	19	15	7	3	8	52	3.65
22	21	15	4	2	11	53	3.62
20	16	21	5	3	9	54	3.59
33	16	18	7	4	8	53	3.57
26	17	14	9	4	8	52	3.54
25	11	26	6	3	8	54	3.54
38	12	19	10	6	6	53	3.47
19	15	18	6	7	8	54	3.46
35	15	15	11	4	9	54	3.43
30	17	13	7	5	12	54	3.33
32	15	15	8	3	13	54	3.30
39	8	19	14	5	8	54	3.26
17	12	15	13	3	11	54	3.26
16	14	12	9	8	10	53	3.23
14	9	17	9	7	11	53	3.11
29	11	12	13	7	11	54	3.09
31	9	13	12	7	13	54	2.96
27	7	13	10	11	13	54	2.81
AVERAGE							3.57

FREQUENCY COUNT DATA FOR NON-SPO PERSONNEL

RESPONSE CATEGORIES

QUESTION	NR	MAX	MIN	PRIOR	SUM	SCORE
64	4	14	20	15	53	2.87
62	4	20	18	11	53	2.68
49	4	22	19	8	53	2.58
40	8	22	18	4	52	2.35
50	11	20	16	6	53	2.32
51	8	24	17	4	53	2.32
48	7	26	13	5	51	2.31
43	10	21	18	4	53	2.30
65	15	20	8	10	53	2.25
56	11	23	14	4	52	2.21
41	14	20	15	4	53	2.17
46	12	24	13	4	53	2.17
66	14	23	13	2	52	2.06
61	15	24	10	4	53	2.06
53	13	25	14	1	53	2.06
63	15	25	9	4	53	2.04
47	18	20	11	4	53	2.02
58	14	22	12	1	49	2.00
54	17	21	11	3	52	2.00
44	17	21	13	2	53	2.00
60	18	22	9	4	53	1.98
52	15	24	10	2	51	1.99
57	20	21	8	4	53	1.92
55	26	14	8	4	52	1.81
67	21	20	7	2	50	1.80
42	26	15	10	2	53	1.77
45	27	17	5	4	53	1.74
59	27	17	8	1	53	1.68

AVERAGE 2.12

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The objective of this research was to determine a relative ranking (in terms of need for job accomplishment) of acquisition training course subject areas for use in updating and improving training courses. The analysis was accomplished by examining the attitudes of personnel taking the training courses typically received by junior acquisition personnel. Specifically, the attitudes towards whether or not particular subject areas are needed for an individuals job accomplishment were solicited. Key findings are that the subject areas most needed for job accomplishment are Group Decision Making, Contracting, and Communication Skills. Specific recommendations to implement these results in junior acquisition officer training courses are made, as are recommendations for further research in this area. Results are based on a small sample and it is recommended that further research be accomplished to further validated the results. Specific recommendations for further research are included in the document.

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